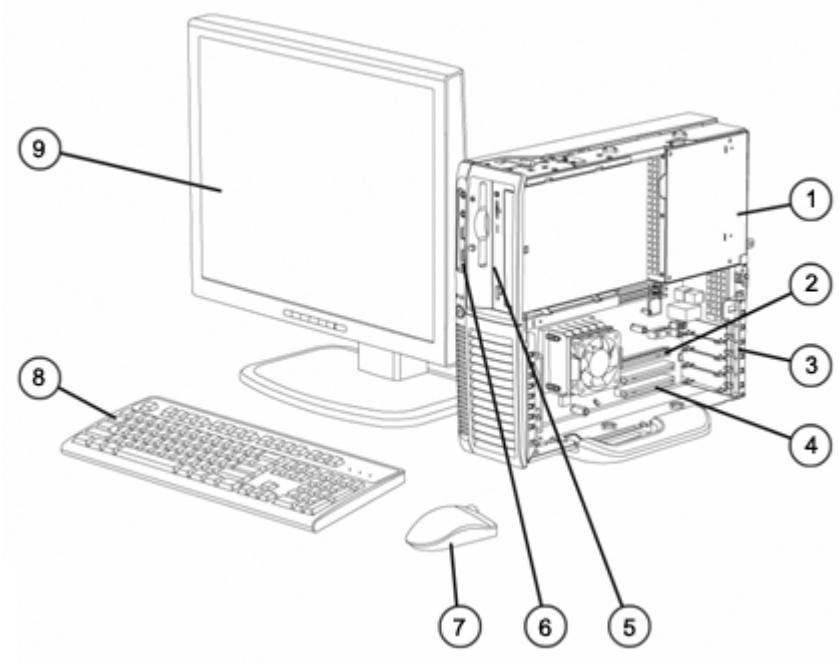
Overview

HP recommends
Windows Vista™ Business

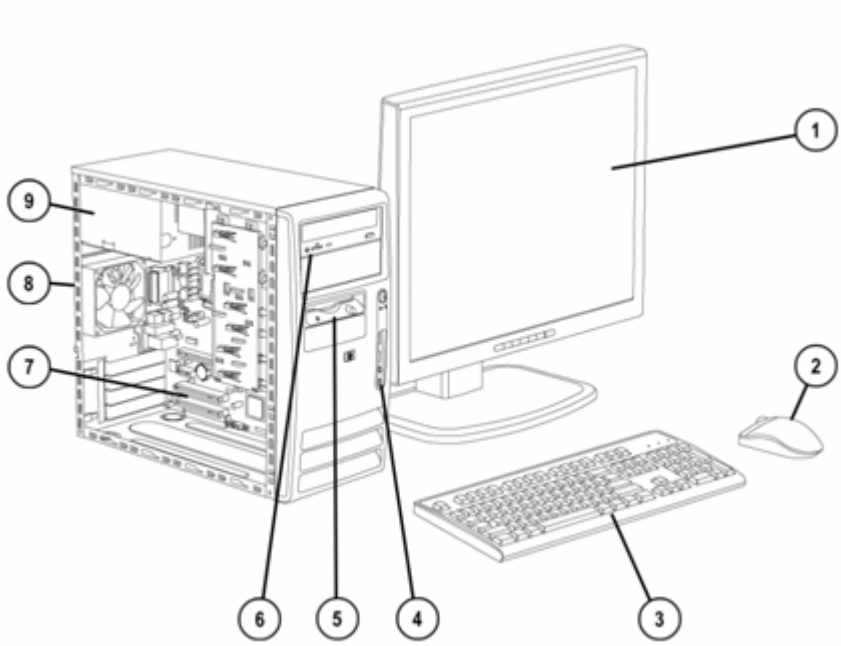
Slimtower



1. 240-watt power supply
2. 1 Low Profile PCI Express x16 slot, 1 low profile PCI Express x1 slot
3. USB 2.0, 1 standard serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out
4. 2 low profile PCI slots
5. 1 – 5.25" external bay; 1 – 3.5" external bay for optional diskette drive, HP 16-in-1 Media Card Reader, or other 3.5" device; 1 – 3.5" internal bay
6. Front I/O: 2 USB 2.0, headphone and microphone
7. 2-Button Scroll Mouse
8. HP Standard Keyboard
9. Monitor (sold separately)

Overview

Microtower



1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. HP Standard Keyboard
4. Front I/O: 2 USB 2.0, headphone and microphone
5. 2 – 3.5" external bays for optional diskette drive, HP 16-in-1 Media Card Reader, or other 3.5" device
6. 2 – 5.25" external bays, and 2 internal 3.5" bays
7. 2 full-height PCI slots, 1 full height PCI Express x1 slot, 1 full height PCI Express x16 slot
8. Rear I/O: 6 USB 2.0, 1 standard serial port, 1 parallel port, 2 PS/2, 1 RJ-45, 1 VGA, audio in/out, microphone in
9. 300-watt power supply

At A Glance

- Choice of operating systems:
  Genuine Windows XP Professional,
  Genuine Windows XP Home,
  SuSE Linux Personal 9.3 OEM (delivered on CDs with system, not pre-installed) – WW except Asia
  FreeDOS
- Intel® Pentium® 4 processors, Intel Pentium D processors, Intel Celeron D processors
- Intel 945G Express chipset with Integrated Intel Graphics Media Accelerator 950
- DDR2 Synch Dram PC2-4200 (533-MHz) and PC2-5300 (667-MHz) Memory
- Integrated Broadcom BCM 5751 NetXtreme Gigabit Ethernet
- Support for up to 1-GHz processor front side bus
- Intel Hyper-Thread Technology on selected processors*1
- Support for high speed 3.0-Gb/s Serial ATA Hard Drives
- Support for PCI Express
- Optimized thermal solutions for each system
- Two tool-less chassis, with outstanding serviceability
- High Definition integrated audio with internal speaker

Overview

- Energy Star compliance with energy-saving features
- Protected by HP Services, including a 3-1-1 standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

[1] The Hyper-Threading feature is a technology designed to improve performance of multi-threaded software products; please contact your software provider to determine software compatibility. Not all customers or software applications will benefit from the use of hyperthreading. Visit http://www.intel.com/info/hyperthreading/ for more information.

Configurable Components - Select Models (localized by Regions)

Model Key and Example

NOTE: This diagram is an example that illustrates how to read the model number.
It is not intended to give every available configuration choice specified in the body of this document and may include references to modules that are out of date and no longer available.

Configurable Components

		Slim Tower	Microtower
Processor and Speed* – One of the following	**Intel Celeron D Processors**		
	Intel Celeron D 331 Processor (2.66-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 336 Processor (2.80-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Celeron D 346 Processor (3.06-GHz, 256K L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 Processors with HT Technology:		
	Intel Pentium 4 521 Processor (2.8-GHz, 1 MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 524 Processor (3.06-GHz, 1-MB L2 cache, 533-MHz FSB)	X	X
	Intel Pentium 4 541 Processor (3.2-GHz, 1-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 620 Processor (2.8-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 630 Processor (3.0-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 631 Processor (3.0-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 640 Processor (3.2-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 641 Processor (3.2-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 650 Processor (3.4-GHz, 2 MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 651 Processor (3.4-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium 4 661 Processor (3.6-GHz, 2-MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D Processors:		
	Intel Pentium D 805 Dual Core Processor (2.66-GHz, 2x1MB L2 cache, 533-MHz FSB)	X	X
	Intel Pentium D 820 Dual Core Processor (2.8-GHz, 2x1MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D 915 Dual Core Processor (2.8-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D 925 Dual Core Processor (3.0-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D 930 Dual Core Processor (3.0-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D 940 Dual Core Processor (3.2-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X

Configurable Components

	Intel Pentium D 945 Dual Core Processor (3.4-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X
	Intel Pentium D 950 Dual Core Processor (3.4-GHz, 2x2MB L2 cache, 800-MHz FSB)	X	X

***NOTE**: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. Not all processors are available in all regions or on all models.

Operating System (one of the following)	Genuine Windows XP Professional SP2	X	X
	Genuine Windows XP Home SP2	X	X
	SuSE Linux Personal 9.3 OEM (delivered on CDs with system, not pre-installed) – WW except Asia	X	X
	FreeDOS	X	X
	NOTE: Microsoft Windows NT 4.0 and Microsoft Windows 2000 are not available on these systems. Some drivers for Windows 2000 are available for download from hp.com.		

Hard Drive One or two of the following	40-GB SATA 1.5-Gb/s Hard Drive (7200 rpm)	X	X
	80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X
	160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X
	250-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 80-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 160-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X
	2nd hard drive, 250-GB SATA 3.0-Gb/s Hard Drive (7200 rpm)	X	X

Memory – One of the following	256-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 256)	X	X
	512-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 512)	X	X
	512-MB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (2 x 256)	X	X
	1-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (1 x 1GB)	X	X
	1-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (2 x 512)	X	X
	2-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (4 x 512)	X	X
	4-GB DDR2 Synch Dram PC2-4200 (533-MHz) Non ECC (4 x 1GB)	X	X
	256-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 256)	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (1 x 512)	X	X
	512-MB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 256)	X	X
	1-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (2 x 512)	X	X
	2-GB DDR2 Synch Dram PC2-5300 (667-MHz) Non ECC (4 x 512)	X	X

Configurable Components

NOTE: For best performance, memory speeds and sizes should not be mixed. See memory section for more information.

Storage – One or more of the following depending on form factor (see Storage section below)	**Diskette Drives**		
	1.44-MB Diskette Drive	X	X
	Multimedia		
	HP 16-in-1 Media Reader (PCI card supplies internal USB connection)	X	X
	Optical Drives		
	48X CD-ROM Drive	X	X
	52X CD-ROM Drive	X	X
	48X/32X/48X CD-RW Drive	X	X
	48X/32X Combo CD-RW/DVD-ROM Drive	X	X
	16X/48X DVD-ROM Drive	X	X
	16X DVD+/-RW Drive (LightScribe/Double Layer/Dual Format)	X	X
Keyboard – One of the following	HP PS/2 2004 Standard Keyboard	X	X
	HP USB 2004 Standard Keyboard	X	X
	HP USB Smartcard Keyboard	X	X
Mouse – One of the following	PS/2 2-Button Scroll Mouse	X	X
	HP PS/2 2-Button Optical Scroll Mouse	X	X
	USB 2-Button Optical Scroll Mouse	X	X
	USB 2-Button Scroll Mouse	X	X
Modem	2006 Agere PCI 56K International SoftModem (full height)		X
	2006 Agere PCI 56K International SoftModem (low profile)	X	
NIC	Broadcom BCM 5751 NetXtreme Gigabit Ethernet integrated on system board	X	X
	Intel PRO/1000 GT Gigabit PCI Adapter (full height bracket)		X
	Intel PRO/1000 GT Gigabit PCI Adapter (low profile bracket)	X	
Wireless	Wireless A+G PCI Adapter (full height bracket)		X
	Wireless A+G PCI Adapter (low profile bracket)	X	

Configurable Components

Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height)		X
	HP FireWire / IEEE 1394 PCI Card (low profile)	X	
	Tower stand	X	
	Rear Port Control Cover	X	
Graphics	Integrated Intel Graphics Media Accelerator 950	X	X
	DVI ADD2 SDVO single head Graphics Adapter	X	X
	ATI RADEON X300 SE PCI Express 128-MB DDR single head DVI with TV out	X	X
	ATI Radeon X1300 256MB LP PCIe DVI w/TV-out	X	X
	ATI RADEON X1600XT 256MB, full-height PCIe, dual DVI w/TV-out	X	X
	NVIDIA Quadro NVS 280 64-MB PCI dual head	X	X
Software	Norton Antivirus 2005 with 60 day Live Update Subscription	X	X
	Microsoft Office 2003 Basic	X	X
	Microsoft Office 2003 Personal	X	X
	Microsoft Office 2003 Professional	X	X
	Microsoft Office 2003 Small Business	X	X
	Microsoft Works 7.0	X	X

Standard Features

	Slim Tower	Microtower
Operating System (Choice)		
Genuine Windows XP Professional SP2	X	
Genuine Windows XP Home SP2	X	
SuSE Linux Personal 9.3 OEM (delivered on CDs with system, not pre-installed) – WW except Asia	X	
FreeDOS	X	
Processor	Intel Pentium 4 processors, Intel Pentium D processors, Intel Celeron D processors	
CPU Bus Speed Supported	533 MHz, 800 MHz, or 1 GHz depending on processor **NOTE:** Processors with a 1-GHz FSB are not currently offered on these models.	
Standard L2 Cache	2 MB, 1 MB or 256 K depending on processor	
Chipset	Intel 945G Express	
Memory Expansion Slots	4 DIMMs	
Memory Type Supported	Non-ECC DDR2 Synch DRAM (ECC not supported by Chipset)	
Memory Speed Supported	DDR2 Synch DRAM PC2-4200 (533-MHz) non-ECC memory DDR2 Synch DRAM PC2-5300 (667-MHz) non-ECC memory	
Maximum Memory	4-GB **NOTE:** With the 915G chipset, some addressable memory gets reserved for the system components and for devices that are added to the system (such as PCIE graphics cards). This will reduce the total addressable memory available for applications to less than 4GB, depending on the number and type of devices that are added.	
Network controller	Integrated Broadcom BCM 5751 NetXtreme Gigabit Ethernet for HP	
Graphics	Integrated Intel Graphics Media Accelerator 950	
Audio	Integrated High Definition audio with Realtek 2 channel ALC260 codec Microphone and Headphone front ports Aux Input connection on system board Line-out and Line-In rear ports on ST* Line-out, Line-in and Microphone rear ports on MT* (All ports are stereo) Internal Speaker **NOTE:** *Rear audio ports are re-taskable as Line-in, Line-out, or Microphone-in, with optional driver, available only through download from HP support website. External speakers must be powered externally.	
PCI slots	2 low-profile (2.5"), length (6.6") standard	2 full-height (4.2"), length (13.4") standard
PCI Express x16 slot	1 low-profile (2.5"), length (6.6")	1 full-height (4.2"), length (10.5")
PCI Express x1 slot	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
External Bays	2 bays (1 – 5.25", length (8.189"), and 1 – 3.5" (supports 2nd HDD)	4 bays (2 – 5.25", length (8.189"), 1 – 5.25" length (5.71") and 1 – 3.5")
Internal Bays	1 – 3.5" hard drive bay	2 – 3.5" hard drive bays
IDE	1 IDE connector for opticals	1 IDE connector for opticals
Hard Drive Interfaces Supported	2 Serial ATA interfaces	2 Serial ATA interfaces
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)	

Standard Features

Ports		
USB 2.0	8 (2 front, 6 rear)	8 (2 front, 6 rear)
Serial	1 standard with 2nd optional	1 standard with 2nd optional
Parallel	1	1
PS/2	1 keyboard, 1 mouse	1 keyboard, 1 mouse
Video	analog (VGA) for integrated graphics	analog (VGA) for integrated graphics
DVI output	available via ADD2 card, PCI-E x16 card, or PCI card	available via ADD2 card, PCI-E x16 card, and PCI card
Support for Multi-Monitor	available via ADD2 card, PCI-E x16 card, or PCI card	available via ADD2 card, PCI-E x16 card, and PCI card
Audio	Front – mic and headphone Rear – line in, line out	Front – mic and headphone Rear – line in, line out, mic in
NIC	Integrated Broadcom NetXtreme Gigabit Ethernet for HP	Integrated Broadcom NetXtreme Gigabit Ethernet for HP
Dimensions		
Chassis Dimensions (H x W x D)	33.78 x 10.03 x 37.85 cm	36.6 x 17.5 x 42 cm
	13.3 x 3.95 x 14.9 inches	14.4 x 6.88 x 16.55 inches
System weight	20.0 lb (9.07 kg)	24.0 lb (10.89 kg)
System volume	782.7 sq. in. (12.8 liters)	1640 sq. in. (27.0 liters)
Shipping weight	30 lb (13.61 kg)	34 lb (15.42 kg)
Shipping Box Size	20.00 x 18.75 x 12.63 in (50.8 x 47.63 x 32.08 cm)	22.25 x 19.63 x 15.13 in (56.52 x 49.86 x 38.43 cm)
Power Supply	240W power supply – Active PFC	300W power supply – Passive PFC
Preinstalled Software (not included with FreeDOS)		
Computer Setup Utility	X	
Microsoft Internet Explorer with Google Toolbar	X	
Altiris Local Recovery	X	
Acrobat Reader	X	
Roxio Cineplayer (with DVD-ROM drive, Combo drive or DVD+/-RW drive)	X	
HP Client Management Solutions (visit http://www.hp.com/go/easydeploy)	X	

After-Market Options

		Slimtower	Microtower	Part Number
Communications	**Wireless LAN**			
	HP Wireless A+G PCI Adapter (WW except North America)	X	X	PZ928AA
	HP BT450 USB Bluetooth Wireless Printer and PC Adapter	X	X	IPQ6398A
	NICs			
	Broadcom NetXtreme Gigabit Ethernet PCI Express x1 Adapter	X	X	EA833AA
	Intel PRO/1000 GT Gigabit PCI (full height only)		X	AG393AA
	Modem			
	2006 Agere PCI 56K International Modem	X	X	EK694AA

		Slimtower	Microtower	Part Number
Graphics	**Single-head solutions**			
	DVI ADD2 Graphics Adapter (full height)	X	X	DY674A
	ATI RADEON X300 SE PCI Express 128-MB DDR singlehead DVI with TV out	X	X	DY596A
	ATI RADEON X1300 256MB DDR PCIE DVI w/TV	X	X	AG392AA
	Multi-head solutions			
	NVIDIA Quadro NVS 280 64-MB PCI dual head (DMS59 connector with dual VGA Y-cable)	X	X	DY599A
	NVIDIA Quadro NVS 280 64-MB PCIE dual head (DMS59 connector with dual VGA Y-cable)	X	X	DY650A
	NVIDIA Quadro NVS 285 128-MB PCIE x 16 dual head VGA	X	X	EE061AA
	Dual DVI Y-cable for DY599A or DY650A	X	X	DL139A

		Slimtower	Microtower	Part Number
Hard Drives	**Serial ATA Hard Drives**			
	40-GB SATA 1.5 Gb/s Hard Drive	X	X	PB371A
	80-GB SATA 3.0-Gb/s Hard Drive	X	X	PY276AA
	160-GB SATA 3.0-Gb/s Hard Drive	X	X	PY277AA
	250-GB SATA 3.0-Gb/s Hard Drive	X	X	PY278AA

After-Market Options

		Slimtower	Microtower	Part Number
Input/Output Devices	**Keyboards**			
	HP PS/2 Standard Keyboard	X	X	DT527A
	HP USB Standard Keyboard	X	X	DT528A
	HP USB Smartcard Keyboard	X	X	ED707AA
	Pointing Devices			
	HP PS/2 2-Button Scroll Mouse (Carbonite)	X	X	DD440B
	HP PS/2 2-Button Optical Scroll Mouse	X	X	EY703AA
	HP USB 2-Button Scroll Mouse (Carbonite)	X	X	DD441B
	HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver)	X	X	DC172B

		Slimtower	Microtower	Part Number
Memory (DIMMs)	**PC2-5300 (DDR2, 667 MHz) DIMMs Non-ECC**			
	1 GB PC2-5300 (DDR2-667) DIMM	X	X	PX976AA
	512 MB PC2-5300 (DDR2-667) DIMM	X	X	PX975AA
	256 MB PC2-5300 (DDR2-667) DIMM	X	X	PX974AA
	PC2-4200 (DDR2, 533 MHz) DIMMs Non-ECC			
	1 GB PC2-4200 (DDR2-533) DIMM	X	X	PV557AA
	512 MB PC2-4200 (DDR2-533) DIMM	X	X	PV560AA
	256 MB PC2-4200 (DDR2-533) DIMM	X	X	PV558AA

Monitors	**CRTs**	
	HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#XXX
	HP v7650 17" (16.0" vis) Flat-face CRT Monitor	PF996AA#XXX
	TFTs	
	HP L1506 15" TFT Flat Panel Monitor - Analog only	PX848AA#XXX
	HP L1706 17" TFT Flat Panel Monitor - Analog only	PX849AA#XXX
	HP L1740 17" TFT Flat Panel Display - Analog/Digital	PL766AA#XXX
	HP L1755 17" TFT Flat Panel Display - Analog/Digital	PL777AA#XXX
	HP L1906 19" TFT Flat Panel Display - Analog only	PX850AA#XXX
	HP L1940T 19" TFT Flat Panel Display - Analog/Digital	EM869AA#XXX
	HP L1955 19" TFT Flat Panel Display - Analog/Digital	PD974AA#XXX
	HP L2065 20" TFT Flat Panel Display - Analog/Digital	EF227A4#XXX
	HP LP2465 24" TFT Widescreen Flat Panel Display - Analog/Digital	EF224A4#XXX
	GSA Monitors	
	HP L717g 17" GSA Flat Panel Monitor	EE191AA#XXX
	HP L919g 19" GSA Flat Panel Monitor	EE192AA#XXX
	Options	
	HP Flat Panel Speaker Bar	EE418AA

After-Market Options

	HP CRT Monitor Multimedia Base			PM552AA

		Slimtower	Microtower	Part Number
Multimedia	HP Satellite Speakers	X	X	ZD929AA

		Slimtower	Microtower	Part Number
Optical Drives	**DVD-ROM Drive**			
	16X/48X DVD-ROM Drive	X	X	PR596A
	CD-ROM Drive			
	48X Max CD-ROM Drive	X	X	DC143B
	CD-RW Drive			
	48X/32X/48X CD-RW Drive	X	X	DL975B
	Combo Drive			
	48X/32X Combo CD-RW/DVD-ROM Drive	X	X	DL976B
	DVD+/-RW Drive			
	16X DVD+/-RW Drive (LightScribe/Double Layer/Dual Format)	X	X	PR595A

		Slimtower	Microtower	Part Number
Removable Storage	**Drive Key Options**			
	256-MB HP Drive Key II (USB 2.0)	X	X	PH657A
	512-MB HP Drive Key II (USB 2.0)	X	X	ED516AA
	1-GB HP Drive Key II (USB 2.0)	X	X	AG382AA
	Diskette and Digital Drives			
	1.44-MB USB Diskette Drive – External (Carbonite)	X	X	DC141B
	1.44-MB Internal Diskette Drive	X	X	DS710G
	Media Reader			
	HP 16-in-1 Media Card Reader with PCI Card	X	X	EM718AA
	Zip Drives and Media			
	Zip 250 Drive (Carbonite)	X	X	DC140B
	Zip 750 Drive (Carbonite)	X	X	DC518B

		Slimtower	Microtower	Part Number
Security	Kensington lock	X	X	PC766A
	HP Business PC Security Lock	X	X	EV265AA

After-Market Options

		Slimtower	Microtower	Part Number
Software	HP Client Foundation Suite Includes: HP Client Manager HP Systems Insight Manager Connector Altiris Local Recovery Pro Altiris Migration Suite	X	X	EF117AA (use EF118AA for 1000+ licenses)
	HP Client Premium Suite Includes: HP Client Manager HP Systems Insight Manager Connector Altiris Local Recovery Pro Altiris Migration Suite Altiris Connector Solution Altiris Client Management Suite Level 1 HP OpenView Connector	X	X	EF119AA (use EF120AA for 1000+ licenses)
Miscellaneous Accessories	HP FireWire / IEEE 1394 PCI Card	X	X	PA997A
	USB to serial adapter cable	X	X	EM449AA

Memory

945G Express chipset

DDR2 SYNCH DRAM NON-ECC MEMORY

It is not necessary to add memory in pairs. Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations. The Intel 945G Express chipsets support non-ECC DDR2 PC2-4200 (533-MHz) and PC2-5300 (667-MHz) memory.

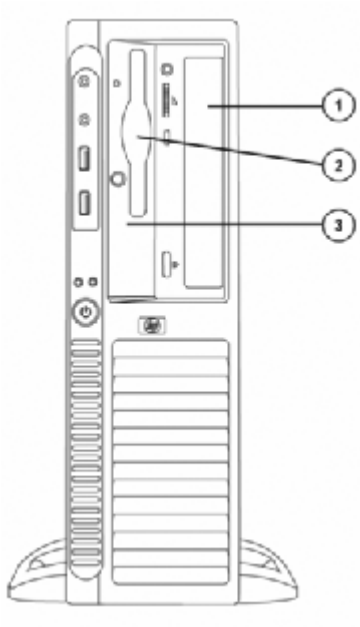
For best performance, add in pairs, add in same channel, and do not mix speeds. For dual-channel performance, the total amount of memory in each channel should be equal. If speeds are mixed, speed will default to the slowest DIMM.

MAXIMUM MEMORY (SLIMTOWER AND MICROTOWER)
Supports up to 4-GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.
NOTE: In 4-GB configuration, all memory may not be available due to system resource requirements.

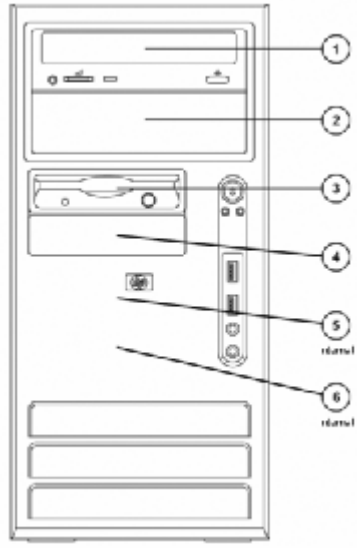
DIMM Size	Slot			
	Channel A		Channel B	
	1	2	3	4
256-MB	256-MB			
512-MB	512-MB			
512-MB (dual-channel)	256-MB		256-MB	
1-GB	1-GB			
1-GB (dual-channel)	512-MB		512-MB	
2-GB (dual-channel)	512-MB	512-MB	512-MB	512-MB
4-GB maximum (dual-channel)	1-GB	1-GB	1-GB	1-GB

Storage

Slim Tower



Microtower



	Quantity Supported	Position Supported	Controller
Slim Tower			
Diskette Drive	1	2	Diskette
5.25" Storage Bays	1	1	IDE
3.5" Storage Bay	1	3	IDE
Microtower			
Diskette Drive	1	3	Diskette
5.25" Storage Bays	1	1, 2	IDE
3.5" Storage Bay	1	3, 4, 5, 6	IDE

Technical Specifications

Base Unit Contents	Slim Tower	Microtower
Coprocessor	Integrated	
L2 Cache Architecture/Speed	Full core clock speed	
Cache Upgradeable	Not upgradeable – Integrated into Processor	
System board with Intel 915 Express Chipset with Integrated graphics	X	
Cables	ATA Cable	
Quick Setup Poster	X	
Product Documentation on CD	X	
Operating System CD	X	
Restore CD	X	
Power Cord	X	
Keyboard	X (PS/2)	
Mouse	X (PS/2)	
Memory Parity	Not Needed for non-ECC	
ECC Memory	Not Supported by chipset	
Serial Presence Detect Support	Supported	
Hard Drive Interfaces Supported	2 Serial ATA interfaces	2 Serial ATA interfaces
Hard Drive Controller (PCI) Supported	Serial ATA (support for SATA 1.5-Gb/s and 3.0-Gb/s hard drives)	

System Board	Slim Tower	Microtower
Architecture	P4/PCI/PCI Express	
Chipset	Intel 945G Express Chipset	
I/O Controller	LPC47B397	
System Board Form Factor	custom BTX-like	micro ATX
Processor Socket - 775 Pin ZIF	X	
DIMM Connectors (2.5V)	4	
Intel Graphics Media Accelerator 900 integrated	X	
PCI Connector	2 low profile	2 full height
PCI Express x16	1 low-profile (2.5"), length (6.6")	1 full-height (4.2"), length (10.5")
PCI Express x1	1 low profile (2.5"), length (6.6")	1 full-height (4.2"), length (13.4")
Audio (High Definition)	X	
AUX IN (Audio)	X	
Clear CMOS Button	X	
CPU Fan Header	X	
Chassis Fan Header	X	
Chassis Speaker Header	X	
CMOS Battery Holder – Lithium	X	
Integrated Broadcom NetXtreme Gigabit Ethernet for HP	X	
Wake-On-Lan®	X	
ASF 2.0 (Alert Standard Format)	X	

Technical Specifications

Power Supply Header	X	
Power Switch, Power LED & Hard Drive LED Header	X	
Password Clear Header	X	
Riser Connector	X	--

Chassis	**Slim Tower**	**Microtower**
Color	Carbonite/Silver	
System Board Form Factors Supported	Custom	micro ATX
Power Supply Fan (Variable Speed)	X	
Processor Fan-Heatsink (Variable Speed)	X	
Chassis Fan	X	
Internal Speaker	X	
Security Locks Supported	Kensington Cable Lock Provision (Lock not included) Hood Cover Security Loop (Lock not included) HP Desktop Security Lock (Lock not included)	
Security Loop hole diameter	0.236 inches	

Unit Environment and Operating Conditions	**Slim Tower**	**Microtower**
General Unit Operating Guidelines • Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range. • Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow. • Never restrict airflow into the computer by blocking any vents or air intakes. • Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air. • Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow. • If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.		
Temperature Range	Operating: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)	
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (non-condensing at ambient)	
Maximum Altitude (unpressurized)	Operating: 10,000 ft (3048 m) Non-operating: 30,000 ft (9144 m)	
***NOTE**: Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.		

Technical Specifications

Interfaces	Slim Tower	Microtower
Serial Port	1 standard, 2nd via option	
Parallel Port	1	
PS/2	1 Keyboard and 1 Mouse	
USB (2.0)	8 ports (6 rear/2 front)	
RJ-45 10/100/1000 Network	X	
Keyboard	X (PS/2)	
Mouse	X (PS/2)	
Multibay	none	
Video (VGA)	X	
Audio	X	

Power Supply	Slim Tower	Microtower
Power Supply	240 Watt Power Supply – active PFC	300 watt custom power supply - Passive PFC)
Operating Voltage Range	90 – 264 VAC	90 - 132 / 180 - 264 VAC
Rated Voltage Range	100 – 240 VAC	100 - 127 / 200 - 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz
Operating Line Frequency Range	47 – 63 Hz	47 – 63 Hz
Rated Input Current	5A	4A @ 110V / 8A @ 220V
Heat Dissipation	Typical 340 btu/hr (86 kg-cal/hr) Maximum 1260 btu/hr (318 kg-cal/hr)	Typical 375 btu/hr (95 kg-cal/hr) Maximum 1575 btu/hr (483 kg-cal/hr)
Power Supply Fan	80mm variable speed	80mm variable speed
Energy Star Compliant	X	X
FEMP Standby Power Compliant (<2W in S5 - Power Off)	X	X
Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	< 3W	< 3W
Environmental and Mechanical Engineering Support Center	http://env-webserver.ccm.cpqcorp.net/EMESC/default.htm	

ROM Features	Description	Slim Tower	Microtower
Instantly Available PC (Suspend to RAM - S3)	Allows for very low power consumption with quick resume time	X	X
ROM Based F10 Setup	Review and customize BIOS settings	X	X
Remote System Installation via F12 (PXE) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system	X	X
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS	X	X
BIOS Smart Card Support	BIOS preboot smart card authentication (passwords) via USB CCID compliant smart card readers	X	X
Auto Setup when New Hardware Installed	System automatically detects addition of new hardware	X	X

Technical Specifications

Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, audio, and network ports	X	X
Removable Media Write/ Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media)	X	X
Network Server Mode	Allows for secured keyboard-less operation	X	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X
Master Boot Record Security	Detects changes to MBR and optional restoration, useful in protecting from viruses	X	X
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X
Remote Wakeup	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM	X	X
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to wake from a low power mode • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system	X	X
Keyboard-less Operation	The system can be operated without a keyboard	X	X
SMBIOS Ver. 2.4	System Management BIOS, previously known as DMI BIOS, for system management information	X	X
No Fault Found (NFF) reduction for memory	F10 setup option allows DIMM identification and failure analysis	X	X
HP Client Management Interface	Uses industry standards including Microsoft Windows Management Interface, WBEM, SMBIOS, and ACPI, to allow system management tools (e.g. HP Systems Insight Manager, Microsoft SMS) to request in-depth client inventory, receive health status information, and manage system BIOS settings by communicating directly with the client computer.	X	X
Wake on USB insertion	Allows system to wake from low power state on USB device insertion	X	X
Setup browse mode	Allows option to be set where F10 settings are not visible when setup password is set	X	X
Default Setup	Allows user to save custom F10 Setup settings as defaults. If CMOS settings are lost, such as during battery replacement, the user can restore the custom settings by selecting Apply Defaults and Exit. If desired, factory defaults can be restored through the same menu item.	X	X
BIOS Power-On	Allows user to select the day(s) of the week and the time of day the system will automatically power on. Works only from Off state (S5), not from sleep states S3 or S4.	X	X
Windows-based BIOS upgrade	Supported	X	X
System Management Interrupt (SMI) security	Prevents system management mode from being disabled (e.g. to bypass password security)	X	X

Technical Specifications

Data Execution Prevention (DEP)	F10 setup option, enabled by default with supported processors, to help prevent malicious code and viruses from executing in the operating system	X	X

Software	Description	Slim Tower	Microtower
Preinstalled Software		X	X
Genuine Windows XP Professional SP2		X	X
Genuine Windows XP Home SP2		X	X
Computer Setup Utility		X	X
Microsoft Internet Explorer		X	X

Initial Configuration and Deployment	Description	Slim Tower	Microtower
HP Client Management Solutions (requires software download)	HP Client Management Solutions help simplify management of PCs and significantly reduce total ownership costs. These solutions share a common design and are highly integrated due to the extensive work between HP and its partner Altiris. HP Client Manager is included free with all HP business PCs. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems: ● Get valuable hardware information such as CPU, memory, video, and security settings ● Monitor system health to fix problems before they occur ● Install drivers and BIOS updates without visiting each PC ● Remotely configure BIOS and security settings Automate processes to quickly resolve hardware problems Additional Altiris solutions (fee-based) are available to address PC management challenges through the entire IT lifecycle including: ● Inventory assessment ● Software license compliance ● Personality migration ● Software image deployment ● Software distribution ● Asset management ● Client backup and recovery ● Problem resolution Visit http://www.hp.com/go/easydeploy for more information, to download HP Client Manager, and to evaluate the Altiris solutions.	X	X
Replicated Setup	Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup	X	X
Support Software CD	--	X	X
Software Restore CD	Restores computer to its original factory shipping image	X	X

Technical Specifications

Asset Tag	• Repository for storing company-specific property asset numbers for easy tracking • Initially set equal to the system serial number • Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program	X	X
DIMM Serial Presence Detect	Detects whether or not memory DIMMs are present and their type	X	X
Hard drive serial number, model, and manufacturer	Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup	X	X
Monitor serial number, model & manufacturer	--	X	X
System serial number, model, & manufacturer	System serial number, model, & manufacturer stored in a non-volatile memory and can be retrieved with management SW or viewed in ROM-based F10 setup	X	X
ROM revision levels	• Identifies system ROM revision levels and reports in ROM-based F10 setup • Version is stored in an industry standard memory location (SMBIOS) so that management SW applications can use and report this information	X	X
System board revision level	• Allows management SW to read the revision level of the system board • Revision level is digitally encoded into the hardware and cannot be modified	X	X
Memory Change Alert	Alerts management console if memory is removed or changed	X	X
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen	X	X

Security Features	**Description**	**Slim Tower**	**Microtower**
Mechanical Hood Security Provision	Security Loop	X	X
Kensington Lock Support	Kensington lock slot on the chassis	X	X
Cable Lock Provision	Physically secure computer hardware from theft	X	X
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them form the operating system	X	X
Removable Media Write/ Boot Control	Prevents the computer from being booted from removable media on supported devices (and can disable writes to media)	X	X
Power-On Password	Prevents an unauthorized person from booting up the computer	X	X
Setup Password	Prevents an unauthorized person from changing the system configuration	X	X
HP Desktop Security Lock kit support	Protects PC from theft or tampering and includes master key		

Technical Specifications

Fault Notification and Recovery	Description	Slim Tower	Microtower
SMART Hard Drives, Fault & Prefailure Notification	• Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure	X	X
Memory Change Notification (Requires HP Client Manager Software)	Alerts management console if memory is removed or changed	X	X
Thermal Notification (Requires HP Client Manager Software)	Monitors the temperature state within the chassis. Three modes: • NORMAL – normal temperature ranges • ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs	X	X
Altiris Local Recovery	Provides data and system file protection for HP business PCs to enable fast recovery of information that is accidentally deleted or if the system becomes corrupted. Designed for disconnected or seldom-connected users, Local Recovery protects your HP computer's data and system state by taking scheduled snapshots, which are then stored in a protected area on the local hard disk. System backup and disaster recovery is now simple and fast for all users, regardless of connectivity.	X	X
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V	X	X
Ultra ATA Integrity Monitoring (CRC Checking)	Provides data transfer verification and proactive notification of hard drive data transmission problems with recommendations for enhancing system performance. It detects all the following errors types: • single bit errors • double bit errors • an odd number of errors • error bursts up to 32-bits long	X	X

Technical Specifications

System Software Updating	Description	Slim Tower	Microtower

Subscriber's Choice	Free web-based subscription service that provides customized support information, products tips, and feature articles based on subscriber profile
	• E-mail Driver and Support Alerts/Notifications (available WW)
	  ○ Proactive email information on drivers, software patches, product change notifications, and customer advisories on HP product lines
	  ○ The Product Change Notification service provides information on hardware and software changes that will be implemented in manufacturing up to 60-days in advance
	• E-newsletters (available NA)
	  ○ HP Technology at Work
	  ○ SMB Promotional Newsletter		

Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console	X	X
Remote Wakeup/ Remote Shutdown	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.	X	X
ROM Based Setup (F10) and Start-up Diagnostics	--	X	X
Support Software CD & WWW	--	X	X

Other Features	Description	Slim Tower	Microtower
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.	X	X
SMBIOS	System Management BIOS, previously known as DMI BIOS, for system management information	X	X
Wired for Management Support	Intel-driven, industry-wide initiative to make Intel architecture-based PCs, servers and mobile computers more inherently manageable right out of the box and over the network	X	X
Dual-State Power Button	Power button acts as both an on/off button and suspend-to-sleep button	X	X

Technical Specifications

Serviceability Features of System	Description	Slim Tower	Microtower
Dual Color Power LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	--	X	X
Diagnostic LED Explanation Table	Number of 1-second red LED blinks followed by 2-second pause, then repeats: 2-processor thermal protection activated 3-processor not installed 4-power supply failure 5-memory error 6-video error 7-PCA failure (ROM detected failure prior to video) 8-invalid ROM, bootblock recover mode	X	X
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS	X	X
Flash Recovery with Video Configuration Record SW	--	X	X
Over-Temp Warning on Screen (Requires IM Agents)	--	X	X
HP OS CD (Restore OS CD)	Restores computer to its original factory shipping image	X	X
HP Restore CD	Restores the computer to its original factory shipping image	X	X
Flash ROM	--	X	X
5 Aux Power LED on System PCA	--	X	X
Clear Password Jumper	--	X	X
Clear CMOS Button	--	X	X
CMOS Battery Holder for easy Replacement	--	X	X
Processor ZIP Socket for easy Upgrade	--	X	X
DIMM Connectors for easy Upgrade	--	X	X
NIC LEDs (integrated) (Green & Amber)	Used to determine NIC status	X	X

Technical Specifications

Serviceability Features of Chassis	Description	Slim Tower	Microtower
Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions	--	X	X
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments	X	X
Front power switch	--	X	X
Green Pull Tabs, and Quick Release Latches for easy Identification	--	X	X
Color coordinated cables and connectors		X	X
System memory can be upgraded without removing the system board or any internal components	Eases memory upgrading	X	X
Tool-less Hood Removal	Eases entry to the chassis without use of special tools	X	X
Tool-less Hard Drive, CD & Diskette Removal	--	X	X
Tool-less System Board Removal	No special tools required for system board removal or maintenance	X	X
Towerable	Product can be oriented as a tower (in addition to desktop orientation)	X	X
Drive Self Tests (DPS)	• Drive Protection System • A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user. • Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced. • The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures	X	X
DPS Access through F10 Setup during Boot		X	X
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted • Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count • By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure	X	X
SMART I - Drive Failure Prediction		X	X
SMART II - Off-Line Data Collection		X	X
SMART III - Off-Line Read Scanning with Defect Reallocation		X	X

Technical Specifications

RoHS Compliance	Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. From July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive). Prior to this date, customers interested in purchasing RoHS compliant product should contact their local HP sales or distribution office to determine specific configuration status.

Service and Support	On-site Warranty and Service Note 1: This three-year (3-1-1), limited warranty and service offering delivers three years of parts and one year of both labor and on-site repair. Response time is next business-day Note 2 and includes free telephone support Note 3 24 x 7. Global coverage Note 2 ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. Some countries/regions do not offer one year onsite and labor.
	NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
	NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
	NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

Technical Specifications - Audio

High Definition Audio	**Type**	Integrated
	High Definition Stereo Codec	Yes – Realtek ALC 260
	Audio Jacks	Microphone-In (64-K ohm Input Impedance); front and rear stereo analog microphone ports available except for ST, which has front stereo microphone only Line-In (64-K ohm Input Impedance) Line-Out * (200 ohms Output Impedance, expects at least a 10-K ohm load) Headphone-Out (1 Ohm Output Impedance, expects at least a 32 ohm load)
	NOTE: *Internal Speaker Amplifier is for Internal Speaker only. External Speakers need to be powered externally.	
	Sampling	8 kHz – 192 kHz
	Wavetable Syntheses (software)	Yes – Uses OS soft wavetable
	Analog Audio	Yes
	Number of Channels on Line-Out (mono/stereo)	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	1.5 W
	Internal Speaker	Yes
	External Speaker Jack (Line-Out)	Yes

Technical Specifications - Communications

Integrated Broadcom NetXtreme Gigabit Ethernet	**Connector**		RJ-45
	Controller		Broadcom 5751 PCI-Express LAN Controller
	Memory		Integrated 96Kb frame buffer memory
	Data rates supported		10/100/1000 Mbps
	Compliance		IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture		PCI-E
	Data path width		Single channel, PCI-E
	Data transfer mode		Bus-master DMA
	Hardware certifications		FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement		3.1 watts @ +3.3V AUX supply with 5V tolerance
	Boot ROM support		Yes
	Network transfer rate		10BASE-T (half-duplex) 10 Mbps
			10BASE-T (full-duplex) 20 Mbps
			100BASE-TX (half-duplex) 100 Mbps
			100BASE-TX (full-duplex) 200 Mbps
			1000BASE-T (full-duplex) 2000 Mbps
	Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
		Operating humidity	85% at 131° F (55° C)
	Management capabilities		ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility
	Alerting		N/A

Intel PRO/1000 GT Gigabit PCI NIC	**Connector**	RJ-45
	Controller	Intel 82541PI Gigabit Controller
	Memory	Integrated 64KB configurable transmit receive buffer memory
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI 2.3
	Data path width	32-bit, 33/66 MHz bus interface
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	(800mA) 4watts @ +5VDC
	Boot ROM support	Yes

Technical Specifications - Communications

Network transfer rate	10BASE-T (half-duplex) 10 Mbps	
	10BASE-T (full-duplex) 20 Mbps	
	100BASE-TX (half-duplex) 100 Mbps	
	100BASE-TX (full-duplex) 200 Mbps	
	1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)	
Environmental	**Operating temperature**	32° to 131°F (0° to 55° C)
	Operating humidity	85% at 131° F (55° C)
Dimensions	6.4 x 4.8 x 0.8 in (16.3 x 12.1 x 1.9 cm)	
Management capabilities	ACPIWOL and DMI 2.0, S5 WOL, WMI, PXE 2.0, RPL	

2006 Agere PCI 56K International SoftModem

Data Transmission	Technology speeds: 56,000 Kbps maximum downstream data, controllerless
NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.	
Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/ 9,600/7,200/4,800/2,400/1,200/300
Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
Power Management	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
Upgradeability	Driver upgradeable for future enhancements
Video	ITU-T V.80 video ready interface
Other	TIA/EIA 602 standard AT command set
	Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface
	Optional ring wakeup signal
Operating Temperature	32° to 158° F (0° to 70° C)
Operating Humidity	20% to 90%, non-condensing
Power	Requires a 3.3-V auxiliary power rail on PCI bus
	Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
Chipset	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
Dimensions (L X H)	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
Connection	Single RJ-11 connector

Technical Specifications - Communications

Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
Health	Bare PCB material compliant to 94V-0 or better (marked as such)
Other	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

Technical Specifications - Graphics

Integrated Graphics Media Accelerator 950	**3D/2D Controller**	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.
	VGA Controller	Integrated
	Bus Type	PCI Express™ x16 (Internal graphics is automatically disabled if an external PCIE or PCI graphics card is installed. If the external graphics card is installed in a PCI slot, the internal graphics can be re-enabled using the system's BIOS setup utility. If the external graphics card is installed in the PCI Express™ slot, the internal graphics cannot be enabled).
	RAMDAC	Integrated, 400 MHz
	Memory	Graphics memory is shared with system memory. Graphics memory usage can vary from 8-128 MB depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time. Additional memory is allocated for graphics using Intel's Dynamic Video Memory Technology (DVMT) to balance the optimum amount of memory between graphics and other system use. Memory < 256 MB: 8 MB pre-allocated (for DOS) + 24 MB DVMT : max frame buffer of 32 MB 256 MB <= Memory: 8 MB pre-allocated + 120 MB DVMT : max frame buffer of 128 MB
	Controller Clock Speed	400 MHz
	Overlay Planes	Single overlay support with 5x3 filtering
	Maximum Color Depth	32 bits/pixel
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 85Hz at 2048x1536. Varies with mode and configuration. See table below.
	Multi-display Support	Support for one CRT via the motherboard's VGA connector. Support for an additional DVI-D display via the optional DVI ADD2 card. Dual independent displays and dual synchronous (Twin or Clone mode) displays are supported.
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.

Resolutions Supported[1]

Resolution	**Maximum Refresh Rate** (Hz)	
	Analog Monitor	**Digital Monitor**
640 x 480	85	60
800 x 600	85	60
1024 x 768	85	60
1280 x 1024	85	60
1600 x 1200	85	60
1920 x 1080	85	60
1920 x 1200	85	60
1920 x 1440	85	60
2048 x 1536	85	60

1 Modes listed are supported with a single active display. The supported mode list for multiple active displays is a subset of this list. Not all modes will support video playback and some supported modes may use software MC (motion compensation) rather than hardware MC. Not all modes will support 3D acceleration depending on the system configuration (e.g., resolution selected, size of frame buffer, number of installed memory modules, etc.).

NOTE: Other resolutions and refresh rates may be selectable but are not recommended.

DVI ADD2 Graphics

Models	DY674A Intel DVI ADD2 adapter for Microtower and Slimtower
Form Factor	Low-profile card (Full Height (ATX) and Low Profile brackets included in kit)
DVI-D Connector	Compliant with DDWG (Digital Display Working Group) and VESA specifications for a single-link digital DVI (DVI-D) connector.
Dual Head Support	Yes, when used with the integrated VGA connector
Display Devices Supported	HP L1530 HP L1740 HP L1755 HP L1940 HP L1955 HP L2035 HP L2335 **NOTE:** The DVI ADD2 card offers optimal performance with any display that meets applicable VESA standards.
Color Depth	All modes support 8-bpp, 16-bpp, and 24-bpp color depths
Host Interface Connector	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications
Dot Clock	165 MHz maximum
Display Modes	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.

Resolution		**60-Hz LCD**	**60-Hz**	**75-Hz**	**85-Hz**
Blanking		5% reduced	GTF	GTF	GTF
640 x 480	VGA	Yes	Yes	Yes	Yes
800 x 600	SVGA	Yes	Yes	Yes	Yes
1024 x 768	XGA	Yes	Yes	Yes	Yes
1280 x 1024	SXGA	Yes	Yes	No	No
1600 x 1200	UXGA	Yes	Yes	No	No

Technical Specifications - Graphics

ATI RADEON X300 SE PCI Express Graphics	**Models**	ATI RADEON X300 SE PCI Express 128-MB DDR single head DVI with TV out	
	Bus Type	PCI Express (x16 lanes)	
	Maximum Vertical Refresh Rate	85 Hz	
	Display Support	Integrated 400MHz RAMDAC	
	Display Max Resolution	2048 x 1536	
	Board Display Options	**128 MB Card Display Option**	
		DVI-I + TV	
		DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle)	
		TV Connector is a 7-pin mini-DIN (also allowing 4-pin S-Video without adaptor)	
	Board Configuration 128 MB Frame Buffer	**Specification**	**Description**
		Graphics Chip	RADEON X300 SE PCI Express
		Core clock	325 MHz
		Memory clock	200 MHz
		Frame buffer	128 MB DDR
		Memory I/O	64 bit
		Memory Configuration	4 pcs 16M x 16 DDR
	Memory Type	DDR1	
	Maximum Memory	128MB	
	Core Power	16 W (Max board power)	

ATI RADEON X1300 PCIe Graphics Card (256 MB)	**Bus Type**	PCI Express (x16 lanes)	
	Maximum Vertical Refresh Rate	85 Hz	
	Display Support	Integrated 400MHz RAMDAC	
	Display Max Resolution	2048 x 1536	
	Board Display Options	DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector	
	Board Configuration 128 MB Frame Buffer	**Specification**	**Description**
		Graphics Chip	RV515
		Core clock	450 MHz
		Memory clock	250 MHz
		Frame buffer	256 MB DDR2

Technical Specifications - Graphics

	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish
	Core Power	25 W (Max board power)
	Option kit contents	• ATI RADEON X1300 PCIe graphics card with full height bracket attached • Low profile bracket • DVI-to-VGA Adapter • Software CD with graphics drivers • Warranty documentation
	Compliance standards	**EMC Emissions:** a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment c) Canadian Standard ICES-003 is equivalent to CISPR22 d) Taiwanese Standard BSMI e) Japanese VCCI f) Australian C-Tick **EMC Immunity:** CISPR 24:1997/EN 55024:1998 – Information Technology Equipment - Immunity Characteristics – Limits and Methods of Measurement. **Safety:** UL 60950 (USA) & EN 60950 (EU): Safety of Information Technology Equipment, Including Electrical Business Equipment. All boards meet UL PCB flammability requirements.

ATI RADEON X1600XT (256 MB DH) FH PCIe Graphics Card	**Bus Type**	PCI Express (x16 lanes)	
	Maximum Vertical Refresh Rate	85 Hz	
	Display Support	Integrated 400 MHz RAMDAC	
	Display Max Resolution	2560 x 1600 digital, 2048 x 1536 analog	
	Board Display Options	2 DVI-I ports (one port supports dual link DVI). DVI-I supports an analog CRT or flat panel with a VGA connector via the provided DVI-I to VGA adapter 4-pin mini-DIN S-video connector for TV output	
	Board Configuration	**Specification**	**Description**
		Graphics chip	RV530
		Core clock	590 MHz
		Memory clock	690 MHz
		Frame buffer	256 MB GDDR3, 128 bit wide
	Core Power	56 W (Max board power)	

Technical Specifications - Graphics

NVIDIA Quadro NVS 285 128-MB PCIe Dual Head

Form Factor	Low profile, both ATX and low profile brackets included
Graphics Controller	Integrated Quadro 285 2D graphics processor unit (GPU)
Bus Type	PCI-Express
Memory	128 MB DDR (64 MB local frame buffer plus 64 MB of system memory via TurboCache)
Connector	DMS-59 to dual-DVI Y-cable or dual-VGA Y-cable
Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
Multi-monitor Support	Dual analog or digital monitors
RAMDAC	Dual 350 MHz (integrated)
Maximum Pixel Clock	350 MHz
Overlay Planes	One 16-bit Video overlay plane
High-definition Video Processor (HDVP)	Full screen, full frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
Available Graphics Drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) HP qualified drivers may be preloaded or available from the HP support Web site: http://www.hp.com/country/us/en/support.html?pageDisplay=drivers

Analog Resolution	**Maximum Refresh Rate**
640 x 480	240 Hz
800 x 600	240 Hz
1024 x 768	240 Hz
1152 x 864	170 Hz
1280 x 1024	150 Hz
1600 x 1200	100 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	75 Hz
2048 x 1536	60 Hz

Digital Resolution	**Maximum Refresh Rate**
640 x 480	75 Hz
800 x 600	75 Hz
1024 x 768	75 Hz
1152 x 864	60 Hz
1280 x 1024	60 Hz
1600 x 1200	60 Hz
1900 x 1200	60 Hz

Technical Specifications - Graphics

NVIDIA Quadro NVS 280 64MB PCI Dual Head

Form Factor	Low profile (both ATX and low profile brackets included)
Graphic Controller	Integrated Quadro 280 2-D graphics processor unit (GPU)
Bus type	PCI
RAMDAC	Dual 350 MHz integrated
Memory	64-MB DDR with frame buffer and Texture storage
Connector	Single high-density DMS-59 Flex Connector
Dimensions	Low-profile, 2.586 x 6.6 in (6.57 x 16.76 cm)
Controller clock speed	250 MHz
Color depth	32-bits/pixel max
Overlay planes	One 16-bit Video overlay plane
Maximum vertical refresh rate	85 Hz
Multi-monitor support	Dual analog or digital monitors
Dual DVI Support	Yes (with kit DL139A)
High-definition Video Processor (HDVP)	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation
Available graphics drivers	Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) **NOTE:** HP qualified drivers may be preloaded or available from the HP support Web site: http://www.hp.com/country/us/en/support.html?pageDisplay=drivers.

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	75 Hz

Digital Resolution	Maximum Refresh Rate
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1152 x 864	60 Hz
1280 x 1024	60 Hz
1600 x 1200	60 Hz

Technical Specifications - Hard Drives

7200 rpm Serial ATA Hard Drives	**250-GB**	**Capacity**	250,059,350,016 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
			Average	8.5 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	488,397,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160-GB	**Capacity**	163,928,604,672 bytes	
		Height	1 in (2.54 cm)	
		Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
		Interface	Serial ATA (3.0 Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
		Buffer	8 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.9 ms
			Average	9.3 ms
			Full-Stroke	18 ms
		Rotational Speed	7,200 rpm	
		Logical Blocks	320,173,056	
		Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drives

80-GB	**Capacity**	80,026,361,856 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 3 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms
		Average	9.3 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	
40-GB	**Capacity**	40,020,000,000 bytes	
	Height	1 inch (2.54 mm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA	
	Synchronous Transfer Rate (Maximum)	Up to 1.5 Gb/s	
	Buffer	2 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
		Average	8.5 ms
		Full-Stroke	18.0 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	78,165,360	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Input/Output Devices

HP USB Standard Keyboard	**Physical characteristics**	**Keys**	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	**Operating voltage**	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	USB Type A plug connector
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
		Microsoft® PC 99 - 2001	Functionally compliant
	Mechanical	**Languages**	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, installation guide, warranty card, safety and comfort guide	

Technical Specifications - Input/Output Devices

HP PS/2 Standard Keyboard	**Physical characteristics**	**Keys**	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
		Weight	2 lb (0.9 kg) minimum
	Electrical	**Operating voltage**	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		System interface	PS/2 6-pin mini din connector
		ESD	CE level 4, 15-kV air discharge
		EMI - RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC 99 - 2001	Functionally compliant
	Mechanical	**Languages**	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 - 2001	Mechanically compliant
		Acoustics	43-dBA maximum sound pressure level
	Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
	Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	
	Kit contents	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort guide	
HP USB Smartcard Keyboard	**Physical characteristics**	**Keys**	104, 105, 106, 107, 109 layout (depending upon country)
		Form factor	USB basic Smart Card keyboard

Technical Specifications - Input/Output Devices

	Colors	Carbonite/Silver
	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)
	Weight	2 lb (0.9 kg) minimum
Electrical	**Operating voltage**	+ 5VDC ± 5%
	Power consumption	100-mA maximum (with four LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI – RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 – 2001	Functionally compliant
Mechanical	**Languages**	30+ available
	Keycaps	Low-profile design
	Switch actuation	55 g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified tester)
	Switch type	Contamination-resistant membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
SMARTCARD function	**Support**	All ISO 7816 smart cards
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)
	Chipset	SCM STCII
	Standard APIs supported	PC/SC, EMV2000, SET

Technical Specifications - Input/Output Devices

	Power	USB Port Short circuit detection (protects smart card and reader) Power supply compliant with ISO7816 and EMV (5V, 60 mA) Supports 3-V and 5-V cards	
	Power consumption	250-mA maximum draw (50 mA for the keyboard with three LEDs ON and 200-mA maximum startup current using a high-current, 60-mA smart card)	
	Communication	**From card**	Programmable from 9,600 baud to 115,200 baud
		From computer	Up to 38,400 baud
	Landing mechanism	**Contact device**	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles
	Interface modes	USB communications through USB port SCM protocol Automatic card insertion/removal detection	
	Reader performance interface	USB connection	
	Electro-magnetic standards	**Europe**	89/336/CEE guideline
		USA	USAFCC part 15

HP PS/2 Scroll Mouse	**Dimensions**	3.8 x 6.3 x 11.6 cm (1.5 x 2.5 x 4.6 in)	
	Weight	4.44 oz (126 g)	
	Environmental	**Operating temperature**	50° to 122° F (10° to 50° C)
		Non-operating temperature	22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	20% to 80% (non condensing at ambient)
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, 6-drop sequence
		Drop (out of box)	1 m on asphalt tile over concrete, 6-drop sequence
	Electrical	**Operating voltage**	5 VDC ± 10%
		Power consumption	15 mA
		System consumption	PS/2 mini-din connector

Technical Specifications - Input/Output Devices

		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft® PC99 - 2001	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	65 g nominal peak force
		Switch life	1,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 - 2001	Mechanically compliant
	Scroll wheel	**Width**	8 mm
		Diameter	.99 in (25.2 mm)
		Maximum rotation speed	30 mm/s
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	**Compliant**	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
HP PS/2 Optical Scroll Mouse	**Dimensions** (H x L x W)	3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)	
	Weight	4.44 oz (126 g)	
	Environmental	**Operating temperature**	-32° to 104°F (0° to 40° C)
		Non-operating temperature	-4° to 140°F (-20° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	10% to 90% non condensing
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Electrical	**Operating voltage**	5 VDC ± 10%
		Power consumption	100mA

Technical Specifications - Input/Output Devices

		System consumption	PS/2 mini-din connector
		ESD	CE level 4, 15 kV air discharge
		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft PC99 – 2001	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	61 g nominal peak force
		Switch life	3,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 – 2001	Mechanically compliant
	Scroll wheel	**Width**	8 mm
		Diameter	1.01 in (25.6 mm)
		Maximum rotation speed	48 rats/sec
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	**Compliant**	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
HP USB Scroll Mouse	**Environmental**	**Operating temperature**	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non condensing at ambient)
		Non-operating humidity	20% to 80% (non condensing at ambient)
		Operating shock	40 g, 6 surfaces
		Non-operating shock	80 g, 6 surfaces
		Operating vibration	2 g peak acceleration
		Non-operating vibration	4 g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, 6-drop sequence
		Drop (out of box)	1 m on asphalt tile over concrete, 6-drop sequence
	Electrical	**Operating voltage**	5 VDC ± 10%
		Power consumption	15 mA
		System consumption	USB Type-A plug connector
		ESD	CE level 4, 15 kV air discharge

Technical Specifications - Input/Output Devices

		EMI-RFI	Conforms to FCC rules for a Class B computing device
		Microsoft® PC99 - 2001	Functionally compliant
	Mechanical	**Resolution**	400 ± 20% DPI
		Tracking speed	10 in/s (25.4 cm/s) maximum
		Acceleration	100 in/s/s (2.54 m/s/s)
		Switch actuation	65 g nominal peak force
		Switch life	1,000,000 operations (using Hasco modified tester)
		Switch type	Low force micro-switches
		Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
		Cable length	6 ft (1.8 m)
		Microsoft PC99 - 2001	Mechanically compliant
	Scroll wheel	**Width**	8 mm
		Maximum rotation speed	30 mm/s
		Switch type	Light force micro-switch
		Switch life	1 million operations
		Mechanical life	Minimum 200,000 revolutions
	Regulatory approvals	**Compliant**	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

HP USB Optical Scroll Mouse	**Dimensions** (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)
	System requirements	Microsoft® Windows® 95, 98, 2000, Me, and XP Available USB port

Technical Specifications - Optical Storage

16X DVD+/-RW LightScribe Drive (Double Layer / Dual Format)	**Height**	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	ATAPI/EIDE	
	Disc recording capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speed	DVD+R	Up to 16X
		DVD+RW	Up to 4X
		DVD+R DL	Up to 2.4X
		DVD-R	Up to 8X
		DVD-RW	Up to 4X
		CD-R	Up to 40X
		CD-RW	Up to 24X
	Read speed	DVD+R/-R/+RW/ -RW/+R DL	Up to 8X
		DVD-ROM	Up to 16X
		CD-ROM, CD-R	Up to 40X
		CD-RW	Up to 32X
	Access time (typical reads, including settling)	**Random**	DVD: < 130 ms (typical), CD: < 120 ms (typical)
		Full Stroke	DVD: < 240 ms (seek), CD: < 200 ms (seek)
		Startup Time	Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical)
		Stop Time	< 4 seconds
		Cache Buffer	2 MB (minimum)
		Data Transfer Modes	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)
	Power	**Source**	Four-pin, DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
			12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
			12 VDC (< 600 mA typical, 1400 mA maximum)
		Total Drive Power (standby mode)	< 2.5 Watt
	Audio output	**Line-Out**	0.7 VRMS
		Signal-to-Noise Ratio	74 dB
		Channel Separation	65 dB

Technical Specifications - Optical Storage

	Environmental conditions (operating - non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative humidity	10% to 90%
		Maximum wet bulb temperature	86° F (30° C)
	System configuration		Intel Pentium III Processor or later with 128 MB of memory (required); 256 MB recommended 2-D or 3-D graphics cards on primary disk drive for operating system and application software; second disk drive for audio and video data
	Regulatory approvals		MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1153D, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft PC2001 certification, Microsoft Logo for Windows XP and 2000.
16X/48X DVD-ROM Drive	**Height**		5.25-in, half-height
	Interface Type		ATAPI
	Dimensions– External, Excluding Bezel (W x H)		5.88 x 1.71 in (149.5 x 43.5 mm)
	Disc Diameter		12 cm, 8 cm
	Disc Thickness		1.2 mm
	Track Pitch		1.6 µm (CD), 0.74 µm (DVD)
	Disc Center Hole Diameter		15 mm
	Disc Formats		DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R, DVD+R DL ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW
	Disc Capacity	**DVD-ROM**	4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R), 8.5 GB (DVD+R DL)
		CD-ROM	540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)
	Block Size (bytes)		DVD-ROM - 2048; CD-ROM Mode 0 - 2352; CD-ROM Mode 1 - 2352, 2340, 2336, 2048; CD-ROM Mode 2 - 2352, 2340, 2336, 2048
	Access Times (typical reads, including settling)	**DVD-ROM Single Layer**	120 ms (typical)
		CD-ROM Mode 1	90 ms (typical)
		Full Stroke DVD	240 ms (seek) (typical)
		Full Stroke CD	160 ms (seek) (typical)
	Maximum Data Transfer Rates	**CD-ROM Read**	7200 KB/s (up to 48X)
		DVD-ROM Read	21,600 KB/s (16X) Max

Technical Specifications - Optical Storage

	Data Transfer Modes	PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)	
	Power	**Source**	Four-pin, DC power receptacle
		DC Power Requirement	5 VDC ± 5% – 100 mV ripple p-p 12 VDC ± 5% – 200 mV ripple p-p
		DC Current	5 VDC – <800 mA typical, < 1000 mA maximum 12 VDC – < 870 mA typical
	Audio Output Level	0.7 Vrms (typical)	
	Configuration Jumper Block	Master, slave, and cable select modes	
	Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
	Environmental (all conditions non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
		Relative Humidity (operating)	10% to 85%
		Maximum Wet Bulb Temperature (operating)	86° F (30° C)
	Certifications, Approvals	MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, SEMKO, NEMKO, DEMKO, FIMKO, EN 60825-1, UL 60950, and CSA C22.2 60950-2000.	
48X/32X Combo CD-RW/DVD-ROM Drive	**Orientation**	Either horizontal or vertical	
	Disc Loading Mechanism	Half-height, tray load	
	Interface Type	ATAPI	
	Dimensions—external (W x H x D)	5.77 x 1.71 x 7.36 in (14.66 x 4.34 x 18.69 cm) (external, excluding bezel)	
	Disc Diameter	12 cm, 8 cm	
	Disc Thickness	0.05 in (1.2 mm)	
	Track Pitch	1.6 µm (CD), 0.74 um (DVD)	
	Disc Center Hole Diameter	0.6 in (15 mm)	
	Reference Scanning Velocity	1.2 m/s (CD); 3.49 m/s (DVD SL); 3.84 m/s (DVD DL)	
	Read Only Disc Parameters	**Formats and Modes Supported**	CD-ROM-Mode 1; CD-ROM XA-Mode 2; CD-Bridge; CD digital audio; CD Extra; Photo CD (single and multi-session); video CD; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multi-Session , and DVD+RW
		Capacity	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)

Technical Specifications - Optical Storage

	Block Size	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 bytes; DVD-2,048 bytes
Writeable Disc Parameters	**Disc Type**	CD-R and CD-RW
	Write Methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and Modes Supported	CD-ROM; CD-ROM XA; CD digital audio, video CD; CD-Bridge
	Capacity	180 MB (8 cm); 540 MB (12 cm); 650 MB (12 cm); 700 MB (12 cm)
	Block Size	CD-DA-2,352 bytes; mode 0- 2,336 and 2,352 bytes; mode 1-2,048 and 2,352 bytes; mode 2-2,336 and 2,352; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,324 and 2,352 bytes
Access Times (typical)	**Random DVD**	< 140 ms (typical)
	Random CD	< 125 ms (typical)
	Full Stroke DVD	< 250 ms (seek)
	Full Stroke CD	< 210 ms
Data Transfer Rates	**CD-R write**	7200 KB/s (48X) Max
	CD-RW write	4800 KB/s (32X) Max
	CD-ROM, CD-R, CD-RW read	7200 KB/s (32X) Max
	DVD ROM read	21,632 KB/s (16X) Max
Data Transfer Modes	ATA PIO mode 4); ATA Multi-word DMA mode 2; ATA UltraDMA mode 0; ATA UltraDMA mode 1, mode 2; ATA UltraDMA Mode 3 (default)	
Cache Buffer	2 MB (minimum)	
Start-up Time (single)	< 7 seconds typical	
Start-up Time (multi-session)	< 30 seconds typical	
Stop Time	< 4 seconds	

Technical Specifications - Optical Storage

	Power	**Source**	Four-pin, DC power receptacle
		DC power requirement	5 VDC ± 5%—100 mV ripple p-p 12 VDC ± 5%—200 mV ripple p-p
		DC current	5 VCD — < 1A (typical) < 1600 mA (maximum)
			12 VCD — < 600 mA (typical) < 1.4A (maximum)
			Total Drive Power (Standby mode) — < 2.5 watt
	Audio Output Level	0.7 Vrms	
	Configuration Jumper Block	Cable select (default), master and slave modes	
	Data Interface Connector	40-pin, shrouded and keyed, flat ribbon	
	Environmental (all conditions, non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)
		Relative Humidity (operating)	10% to 90%
		Maximum Wet Bulb Temperature (operating)	86° F (30° C)
	Certifications, Requirements	MPC-3 compliant, multi-read requirements, ACA AS/NZS 3548, ANSI C63.4-1992, ATAPI Spec SFF-8020, ATA Spec X3T9.2, CB Bulletin No. 92A, CSA C22.2 No. 950-1995, C.I.S.P.R. Pub 22, EMKO-TSE 207/94, TUV or VDE EN60 950, EN60825-1, Microsoft ®PC2001 certification, Microsoft Logo for Windows XP, 2000	
48X/32X/48X CD-RW Drive	**Orientation**	Either horizontal or vertical	
	Disc loading mechanism	Half-height, tray load	
	Interface type	ATAPI IDE	
	Dimensions-external (W x H x D)	7.99 x 5.88 x 1.71 in (20.3 x 14.93 x 4.34 cm)	
	Weight	2.6 lb (1.2 kg)	
	Disc diameter	12 cm, 8 cm	
	Disc thickness	1.2 mm	
	Track pitch	1.6 µm	
	Disc center hole diameter	15 mm	
	Reference scanning velocity	1.2 m/s	
	Recording/playing time	80 minutes with CD-R media	
	Read only disc parameters	**Formats and modes supported**	CD-ROM-Mode 1; CD-ROM XA-Mode 2 (forms 1 and 2); CD digital audio; CD Extra; CD-I-Mode 2 (forms 1 and 2) and CD-I-Ready; Photo CD (single and multi-session); video CD
		Capacity	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)

Technical Specifications - Optical Storage

	Block size	Mode 1-2,048 and 2,352 bytes; mode 2, form 1-2,048; 2,328; 2,336; 2,340 and 2,352 bytes; mode 2, form 2-2,328; 2,336; 2,340 and 2,352 bytes; CD-DA-2,352 and 2,368 bytes
Writeable disc parameters	**Disc type**	CD-R and CD-RW
	Write methods	Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet
	Format and modes supported	CD-ROM (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD
	Capacity	185 MB (Mode 2, 8cm); 540 MB (Mode 1, 12 cm); 650 MB (Mode 2, 12 cm); 700 MB (Mode 2, 12 cm)
	Block size	Mode 1-2,048 bytes; mode 2, form 1-2,048 and 2,352 bytes; mode 2, form 2-2,352 bytes; CD-DA ---2,352 bytes
Access times (typical)	**Random**	< 120 ms
	Full stroke	< 200 ms
Data transfer rates	**CD-RW write**	4800 KB/s (up to 32X)
	CD-ROM, CD-R read	7200 KB/s (up to 48X)
	CD-RW read	7200 KB/s (up to 32X)
	CD-R write	7200 KB/s (up to 48X)
Data transfer modes	ATA PIO mode 4 (16.7 MB/s); ATA multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA mode 0 (16.7 MB/s) ;ATA UltraDMA mode 1 (24 MB/s) ; ATA UltraDMA mode 2 (33 MB/s) - default.	
Cache buffer	2 MB (minimum)	
Start-up time (single)	< 7 seconds typical	
Start-up time (multi-session)	< 30 seconds typical	
Stop time	< 4 seconds	

Technical Specifications - Optical Storage

	Power	**Source**	Four-pin, DC power receptacle	
		DC power requirement	5 VDC 5%-100 mV ripple p-p	
			12 VDC 5%-200 mV ripple p-p	
		DC current	5 VCD	< 1A (typical)
				< 1600 mA (maximum)
			12 VCD	< 600 mA (typical)
				< 1.4A (maximum)
			Total Drive Power (Standby mode)	< 2.5 watt
	Audio output level	0.7 Vrms		
	Configuration jumper block	Master, slave and cable select modes		
	Data interface connector	50-pin IDE interface		
	Environmental (all conditions, non-condensing)	**Temperature** (operating)	41° to 122° F (5° to 50° C)	
		Relative Humidity (operating)	10% to 90%	
		Maximum Wet Bulb Temperature (operating)	84° F (29° C)	
	Certifications, requirements	ACA AS/NZS 3548, ANSI C63.4-1992, CB Test Certificate for IEC 950, CE Mark, CFR 47 part 15, CNS 13438, CSA C22.2 No. 60950, DHHS/FDA - 1040, EN60825, EN55022:1998, EN55024, EN60 950:2000, ICES-003 class B, IEC 61000 4-2 - 4-11, Nordic EN60 950, TUV or VDE EN60 950, UL 60950, C.I.S.P.R. Publication 22 Class B, BSMI, Microsoft P2001, Microsoft Logo for Windows98, 2000 and XP		

52X Max CD-ROM Drive (APJ only)	**Interface**	ATAPI	
	Data Transfer Rate	Variable (Audio CD) - 1,800 to 3,600 KB/s (24X) Max	Variable (CD-ROM, CD-R)-2,400 to 7,800 KB/s (52X) Max
	Access Time (ms)	Random: <125 ms	Full-stroke seek: <210 ms
	Data Buffer	2MB	
	Disk Formats Read	CD-ROM Mode 1, CD-ROM XA (Mode 2, Form 1 and 2), CD Digital Audio, CD-EXTRA, CD-I (Mode 2, Form 1 and 2) and CD-I Ready, CD-Text, CD-Bridge, Photo CD (Single and Multi Session), Video CD, CD-R and CD-RW Multi-Session	
	Disk Formats Written	None	
	Disk Capacity (CD)	180MB, 540MB, 650 MB, and 700MB	
	Block Size	Mode 1-2,048, 2,352 bytes Mode 2-1, 2,048, 2,328, 2,336, 2,340, 2,353 bytes Mode 2-2, 2,328, 2,336, 2,340, 2,352 bytes CD-DA-2,352, 2,368 bytes	
	Diameter	12 cm; 8 cm	
	Thickness	1.2 mm	
	Track Pitch	1.6 µm	

Technical Specifications - Optical Storage

	Audio Output Level	Line-out-0.7 V	
	Startup Time	<7 seconds (typical); < 30 seconds with multi-session	
	Operating Conditions	**Temperature**	41° to 120° F (5° to 50° C)
		Relative Humidity	10% to 90%
	Dimensions (H x W x D, maximum)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)	
	Weight	2.6 lb (1200 g)	
48X Max CD-ROM Drive	**Interface**	ATAPI	
	Data Transfer Rate	Variable (Audio CD) - 1,800 to 3,600 KB/s (24X) Max	Variable (CD-ROM, CD-R)-2,400 to 7,200 KB/s (48X) Max
	Access Time (ms)	Random: <125 ms	Full-stroke seek: <210 ms
	Data Buffer	2MB	
	Disk Formats Read	CD-ROM Mode 1, CD-ROM XA (Mode 2, Form 1 and 2), CD Digital Audio, CD-EXTRA, CD-I (Mode 2, Form 1 and 2) and CD-I Ready, CD-Text, CD-Bridge, Photo CD (Single and Multi Session), Video CD, CD-R and CD-RW Multi-Session	
	Disk Formats Written	None	
	Disk Capacity (CD)	180MB, 540MB, 650 MB, and 700MB	
	Block Size	Mode 1-2,048, 2,352 bytes Mode 2-1, 2,048, 2,328, 2,336, 2,340, 2,353 bytes Mode 2-2, 2,328, 2,336, 2,340, 2,352 bytes CD-DA-2,352, 2,368 bytes	
	Diameter	12 cm; 8 cm	
	Thickness	1.2 mm	
	Track Pitch	1.6 µm	
	Audio Output Level	Line-out-0.7 V @ 47 Kohm	
	Startup Time	<7 seconds (typical); < 30 seconds with multi-session	
	Operating Conditions	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
	Dimensions (H x W x D, maximum)	1.7 x 5.9 x 8.0 in (4.3 x 15.0 x 20.3 cm)	
	Weight	2.6 lb (1200 g)	

Technical Specifications - Removable Storage

HP 16-in-1 Media Card Reader	**USB Interface**	USB 2.0 High-speed device	
	Advance protocol support	Supports hardware ECC (Error Correction Code) function • Supports hardware CRC (Cyclic Redundancy Check) function • Supports MS 4-bit parallel transfer mode • Supports MS-PRO 4-bit parallel transfer mode • Supports SD 4-bit parallel transfer mode • Supports high-speed 50-MHz SD 4-bit card (version 1.1) • Support high-speed 52-MHz MultiMediaCard 8-bit card	
	Supported media type with card adapter	• MicroSD (T-Flash) • Memory Stick Micro	
	Mechanical		
	Environmental	**Operational Environmental Extremes**	Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours
		Storage Environmental Extremes	Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	

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